
Data options

This chapter describes the Meridian Communications Adapter (MCA), the Meridian Programmable Data Adapter (MPDA), the Asynchronous Data Option (ADO), the Meridian Communication Unit (MCU), and the Analog Terminal Adapter (ATA). This chapter also describes several software features.

Asynchronous Data Option (ADO)

The M2000, M2317, and M3000 can be equipped with an Asynchronous Data Option (ADO) to allow you to make a data call using keyboard dialing from your attached terminal or personal computer. Voice and data communications can be conducted simultaneously without causing any mutual interference.

Functional description

The ADO mounts within the telephone and works in conjunction with the Digital Interface Chip to provide asynchronous communication up to 19.2 kbps from an ASCII data terminal or a personal computer to the Meridian 1 Integrated Services Network. The ADO appears as Data Circuit-terminating Equipment (DCE) in your terminal and connects to the Data Terminal Equipment (DTE) through an RS-232-C connector mounted on the ADO printed circuit board.

The Asynchronous Data Option supports:

- Hayes dialing
- Automatic data rate detection at all rates up to 19.2 kbps
- ASCII keyboard dialing (originating data calls to local and remote hosts or DTE by using the terminal keyboard)
- Call origination to local and remote hosts
- Call termination
- Ring Again Capability
- Auto Dial
- Speed Call
- Automatic or Manual answering of incoming data calls
- Manual Modem pooling
- Remote loopback
- Break detection and generation

ADO operating parameters

[Table 14](#) shows the operating parameters ADO requires.

Table 14
ADO operating parameters

Data type	ASCII
Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	300, 1200, 2400, 4800, 9600, 19200 bits per second (autobaud)
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds
Transmission	Full duplex

The ADO supports asynchronous ASCII operation. A data byte is received from your terminal or personal computer, a control byte is added, and the two bytes are transferred to the associated line card. In the other direction, two data bytes are received from the line card, the control byte is deleted, and the data byte is delivered to your terminal in a bit serial format, at the terminal's bit rate.

ADO external power supply

The ADO requires an external power supply in addition to the power from the line (see [Table 15](#)). A 110 V ac 60 Hz, 100 V ac 50/60 Hz, or a 220 V ac 50 Hz multi-output power supply unit provides nominal voltages of +5 V, +12 V, and -12 V dc. The power supply connects to the back of the telephone through a 5-pin Molex power connector.

If the AC power supply fails, data calls cannot be processed. All external power supplies are equipped with short circuit and thermal shutdown protection.

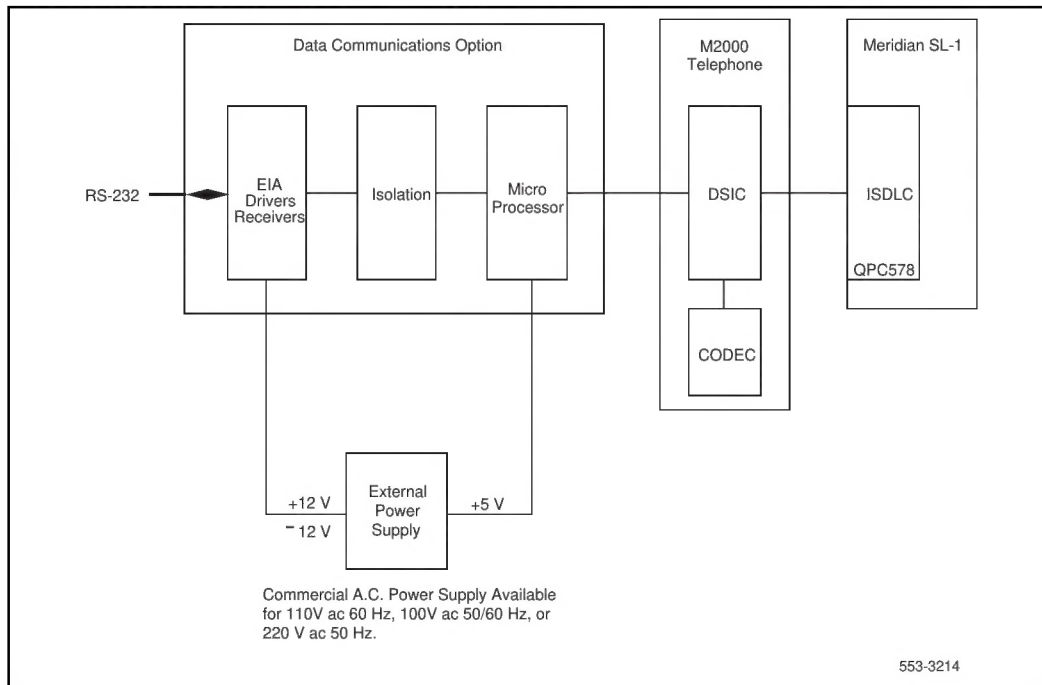
Table 15 lists the input and output requirements for the ADO external power supply.

Table 15
I/O requirements for ADO external power supply

North American version	
NPS50220-03L5	Multi-output external power supply (A0336823), UL listed and CSA approved
Input:	57–63 Hz 115–132 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return) +12 V dc, 200 mA (pin 6 for supply, pin 1 for return) –12 V dc, 200 mA (pin 4 for supply, pin 1 for return)
Japanese version	
NPS50220-03L8	Multi-output external power supply (A0336891), Japan Standard (“T” Mark)
Input:	47–63 Hz 85–115 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return) +12 V dc, 200 mA (pin 6 for supply, pin 1 for return) –12 V dc, 200 mA (pin 4 for supply, pin 1 for return)
European version	
NPS50220-03L5	Multi-output external power supply (A0336166), conforming to NPS50561 general requirements and UL1012
Input:	57–63 Hz 200–240 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return) +12 V dc, 200 mA (pin 6 for supply, pin 1 for return) –12 V dc, 200 mA (pin 4 for supply, pin 1 for return)

Figure 32 shows a block diagram of the ADO and M2000 telephone.

Figure 32
Block diagram of ADO and M2000 telephone



See the *Asynchronous Data user guide* (P0661883), the *M2000 digital telephone user guide* (P0669419), the *M2317 user guide* (P0744260), and the *M3000 Touchphone user guide* (P0800569) for more information on ADO operation. See also the final sections of chapters 2, 3, and 5 for ADO ordering information for the M2000, M2317, and M3000.

Meridian Programmable Data Adapter (MPDA)

Modular telephones before release 18 can be equipped with a Meridian Programmable Data Adapter (MPDA) to allow you to make a data call using keyboard dialing from your attached terminal or personal computer. Voice and data communications can be conducted simultaneously without causing any mutual interference.

Functional description

The Meridian Programmable Data Adapter (MPDA) mounts within the telephone (see [Figure 33](#)) and allows asynchronous ASCII terminals, personal computers, and printers to be connected to the telephone using an RS-232-C interface on a DB-25 female connector.

Features supported by the MPDA include the following:

- Asynchronous transmission at up to 19.2 kbps (autobaud)
- Enhanced Hayes commands, including upper- and lower-case dialing, voice call origination through AT dialing, hang-up data call, and on-line disconnect of voice call
- Script file capability that allows the MDPA to learn a dial-up and logon sequence that can be played back to automatically access a host or service
- Voice Call Origination (VCO)
- DCE mode
- Autodial
- Ring Again
- Speed Call
- Autobaud and Autoparity Detect
- Modem Pool Calling
- Host/Terminal Mode
- Forced Data Terminal Ready (DTR)
- Dynamic Carrier Detect (DCD)
- Inactivity Time-out

- Remote Loopback
- RTS/CTS hardware flow control capability (when calling another MPDA)

The MPDA has the following limitations:

- Only data calls using T-Link, data module-to-data module (DM-DM), or Public Switched Data Service (PSDS) are supported. PSDS can be used only if the transmission mode is set to synchronous.
- The MPDA is supported only on tie, Central Automatic Message Accounting (CAMA), and direct inward dial/direct outward dial (DID/DOD) trunks. CAMA and DID/DOD trunks can be used only for PSDS calls. If a call starts out using T-Link or DM-DM, only tie trunks can be accessed.
- Only tandem data calls are supported across tie trunks, provided all switches involved are NT and data calls are not PSDS calls.
- Meridian 1 ADO does not support T-Link sets. (SL-100 ADO supports T-Link.)
- External data calls can be made only over Digital Trunk Interface (DTI) or ISDN Primary Rate Interface (PRI) trunks.
- External data calls to other Meridian 1 systems require ESN signaling to prevent echo canceling at the far end.
- ADM trunk hunting is not applicable to the MPDA.
- If an MPDA receives extra system parameters, it erases all existing script files stored in its Electronically Erasable Programmable Read only Memory (EEPROM).
- A PSDS call can complete only when both the originating and terminating terminals are set to PSDS; otherwise, the call is dropped.
- Calls connect only if the originating and terminating terminals are set up for synchronous or asynchronous transmission. Both terminals must be in the same mode. For synchronous calls, both terminals must be set at the same speed.

MPDA operating parameters

The MPDA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the MCA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

The MPDA communicates with Data Terminal Equipment (DTE) using the operating parameters shown in [Table 16](#).

Table 16
MPDA operating parameters

Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	110, 150, 300, 1200, 2400, 4800, 9600, 19200 bits per second (autobaud)
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds
Transmission	Full duplex

Note: The MPDA requires an additional power supply board. See the specifications section of Chapter 4 for power requirements information.

[Figure 33](#) shows the back of a Modular telephone with an MPDA mounted; [Figure 34](#) shows a block diagram of the Modular telephone and MPDA.

See the *Meridian Programmable Data Adaptor user guide* (P0705986) or the *Meridian Modular Telephone user guide—North America* (P0820918) for more information on MPDA operation. See also the final section of Chapter 4 for MPDA ordering information.

Figure 33
Back of telephone showing MPDA

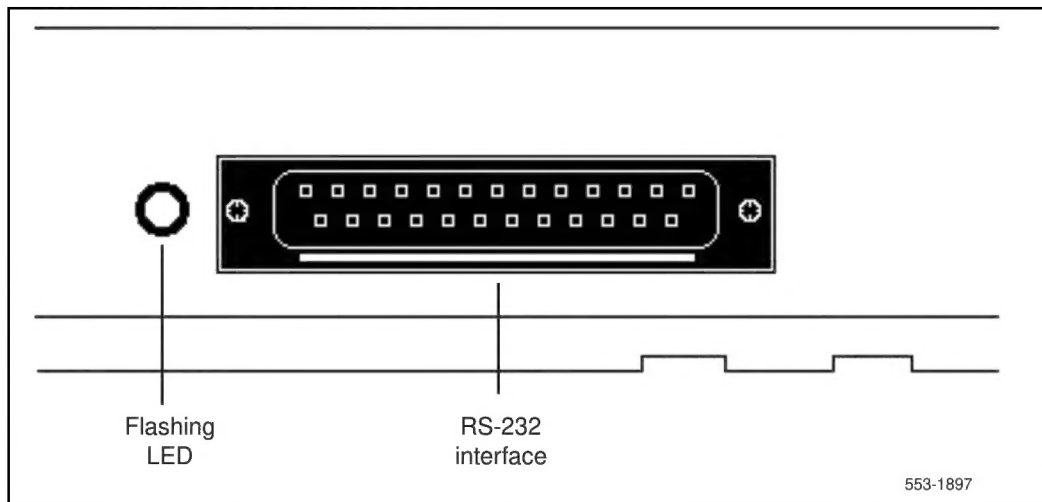
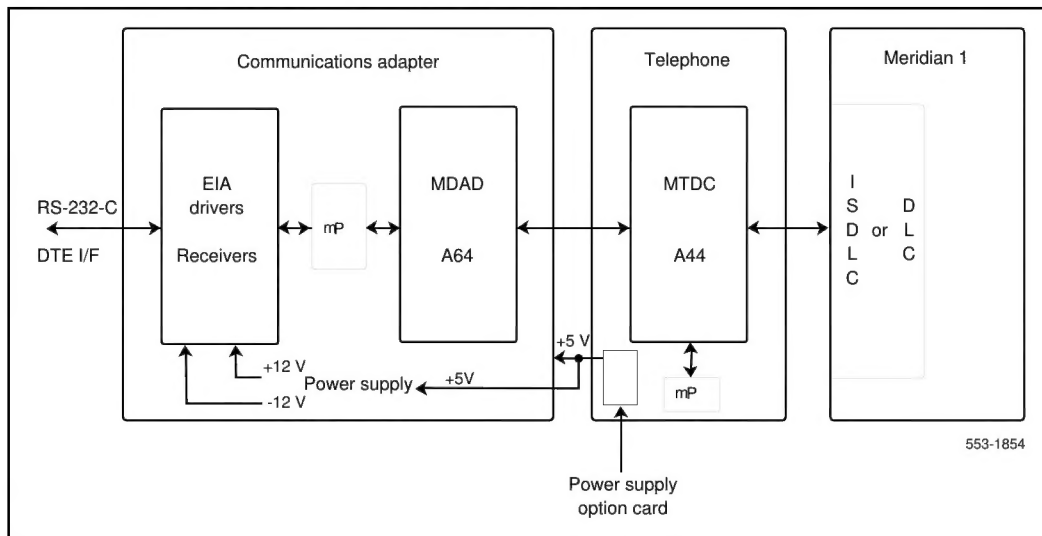


Figure 34
Block diagram of MPDA and Modular telephone



Meridian Communications Adapter (MCA)

The Meridian Communications Adapter (MCA) replaces the MPDA with release 18 and later and offers enhanced capability over the MPDA. An MCA can be configured as an MPDA for use with releases earlier than release 18.

Functional description

The MCA mounts within the telephone (see Figure 3) and allows synchronous and asynchronous ASCII terminals, and personal computers to be connected to the telephone using an RS-232-C or V.35 interface on a DB-25 connector. With release 14 and later, the MCA allows synchronous applications (DTEs such as video conferencing equipment and Group IV fax units) to be connected to the telephone.

Releases 14 through 17 allow access to data functions through the keypad only. However, release 18 and later allow access to data functions via both the keypad and service change in LD 11.

Asynchronous mode features supported by the MCA include the following:

- Asynchronous transmission at up to 19.2 kbps (autobaud)
- Enhanced Hayes commands, including upper- and lower-case dialing, voice call origination through AT dialing, hang-up data call, and on-line disconnect of voice call
- Script file capability that allows the MCA to learn a dial-up and log on sequence that can be played back to automatically access a host or service
- Voice Call Origination (VCO)
- DCE mode
- Autodial
- Ring Again
- Speed Call
- Autobaud and Autoparity Detect
- Modem Pool Calling
- Host/Terminal Mode

- Forced Data Terminal Ready (DTR)
- Dynamic Carrier Detect (DCD)
- Inactivity Time-out
- Remote Loopback
- RTS/CTS hardware flow control capability (when calling another MCA)

Synchronous mode features supported by the MCA include the following:

- Half Duplex/Full Duplex
- Internal and external clocking
- Modem and network capability
- Synchronous transmission up to 64 kbps
- Public Switched Data Services compatibility. MCA extends PSDS and 64K restricted and 64K clear capabilities to Modular telephones.
- V.25 bis dialing protocol support at all synchronous speeds up to 64 kbps. High-Level Data Link Control (HDLC) and Bisynch (character oriented) framing of the V.25 commands is supported.
- Programmable echo canceller disabling for 56 and 64 kbps network calls

Synchronous *and* asynchronous mode features supported by the MCA include the following:

- T-Link and DM-DM support

T-Link and DM-DM are Northern Telecom proprietary protocols. The SL-100 and DMS data devices use T-Link. DM-DM is used by Meridian 1 data devices such as ASIM, AIM, ADM, SADM, Asynchronous Data Option (ADO), and MPDA. MCA can use both DM-DM and T-Link.
- Hotline
- Virtual Leased Line
- V.35 interface capability selectable with jumper plugs on the MCA

- Data tandem calls across tie trunks, provided all switches involved are Northern Telecom machines
- PSDS tandem data calls across tie trunks are supported with release 18 or later when each tandem node uses an ISDN Primary Rate Interface (PRI) or Basic Rate Interface (BRI) connection. See *Transparent Data Networking* (553-2731-110) for more information.

Note: Internal PSDS calls are not supported.

MCA operating parameters

The MCA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the MCA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

Operating parameters are downloaded after the MCA is enabled in LD 11. With release 18 and later, system parameters are downloaded when the MCA is configured in LD 11, and power is reset. (See the *X11 input/output guide* (553-3001-400) for prompt and response details.) Data parameters can also be set, with release 18 and later software, through LD 11, as well as by the keypad.

The MCA communicates with Data Terminal Equipment (DTE) using the operating parameters shown in [Table 17](#).

Table 17
MCA operating parameters

Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	110, 150, 300, 1200, 2400, 4800, 9600, 19200 bits per second (autobaud) asynchronous up to 64000 bits per second synchronous
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds (asynchronous only)
Transmission	Half duplex; full duplex

When installing an MCA or MPDA into NTZK or NT2K phone sets with a date code prior to January 1998, a Power Option board is required, along with an additional power source.

When installing an MCA in an NT9K or NT2K phone set with date code of January 1998 or later you will only install the MCA (an additional Power Option board and Jumper board is not required). See the specifications section of Chapter 4 for power requirements information.

[Figure 35](#) shows the back of a Modular telephone with an MCA mounted; [Figure 36](#) shows a block diagram of the Modular telephone and MCA.

See the *Meridian Communications Adaptor user guide* for more information on MCA operation. See also “Ordering information” on page 31 for MCA ordering information.

Figure 35
Back of telephone showing MCA

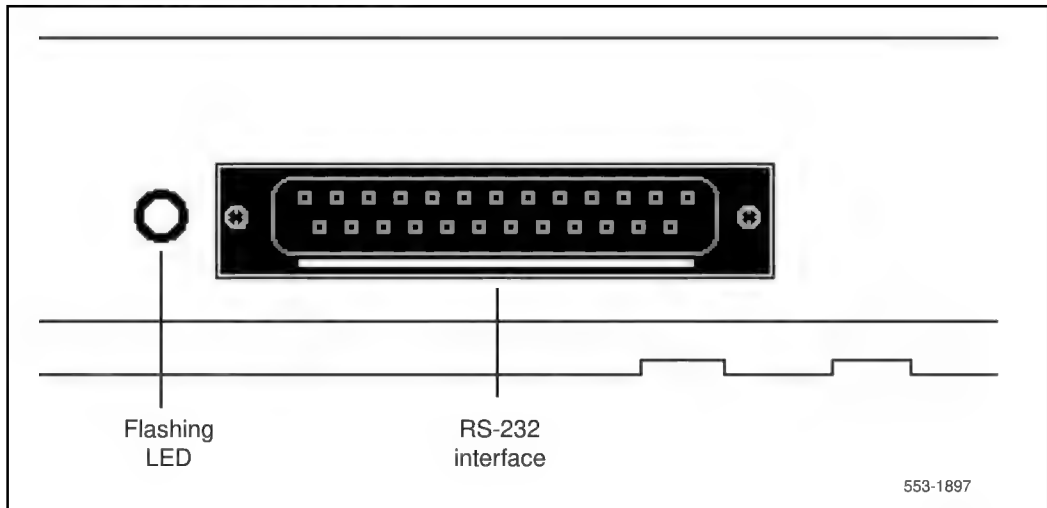
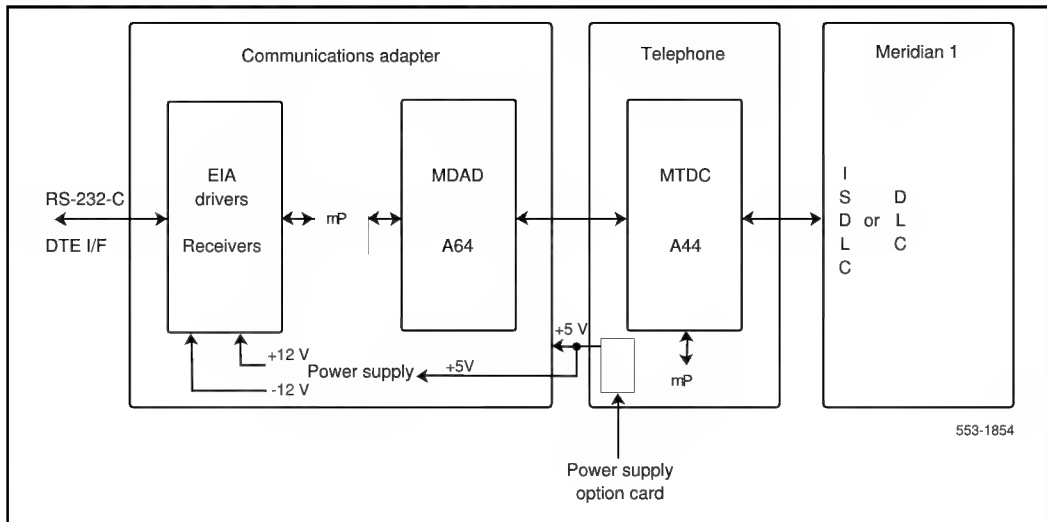


Figure 36
Block diagram of MCA and Modular telephone



Meridian Communications Unit

The Meridian Communications Unit (MCU) is a release 19 feature that provides a stand-alone version of the Meridian Communications Adapter (MCA).

Functional description

The Meridian Communications Unit (MCU) allows you to transmit and receive data using PSDS over either the public network or a private network. The MCU, which replaces the QMT21C, is designed for domestic and international use, with transmission speeds up to 19.2 kbps asynch and 64 kbps synch, integrated display, and self diagnostics. The MCU supports autodialing, ring again, and speed calling, as well as autobauding and automatic parity detection. You can use the MCU for the following:

- Video conferencing
- LAN bridging
- Bulk data/PC file transfer
- Dial back-up
- Host connectivity

The MCU fully complies with RS-232C and can be configured as DCE or DTE to connect to a terminal, printer, or fax machine.

Unlike the MCA, the MCU provides a dedicated call key and call progress tones. The MCU also permits smart modem pooling.

The MCU supports the DM-DM, T-Link, V.25 bis, and PSDS interfaces as well as the RS-232C, CCITT V.35, CCITT V.24, and RS570/RS3449 (with different cables) interfaces. It complies with V.28 for European approval.

Refer to *Meridian Communications Unit and Meridian Communications Adapter description, installation, administration, operation* (553-2731-109) for detailed information on this feature.

Analog Terminal Adapter

The Analog Terminal Adapter (ATA) allows the use of an off-the-shelf analog device (FAX, Modem, Telephone) to operate simultaneously with your Meridian Digital Telephone set. The Analog Terminal Adapter board fits into the footstand space of your Meridian Digital Telephone set.

Functional description

The Analog Terminal Adapter is mounted in footstand of your Meridian Digital Telephone set. The ATA requires a separate AC adapter which provides a 24 volt AC external power source. The ATA does not draw power from your Meridian Digital Telephone set.

The Analog Terminal Adapter (ATA) provides a RJ11 connection for analog equipment to operate on the same line as your Meridian Digital Telephone set. The Analog Terminal Adapter allows you to transmit and receive data using the public switched telephone network (PSTN). The ATA supports an analog device link to the desktop or laptop computer users (with modems) in the digital telephone environment. Currently, it is necessary to install a separate analog phone line to be able to interface with the PSTN.

You can use the ATA for the following analog devices:

- FAX Machine
- Modem
- Analog Telephone

ATA operating parameters

The ATA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the ATA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

Simultaneous voice and data capabilities are available with X11 Release 22 or later. When the ATA is installed the System Administrator must activate the Flexible Voice and Data feature by configuring Overlay 11. See the *X11 input/output guide* (553-3001-400) for prompt and response details.

The ATA will not provide simultaneous voice and data if the X11 software release is prior to release 22.

The Analog Terminal Adapter (ATA) is capable of receiving dial pulse or DTMF address signaling from the analog equipment.

The ATA uses the 2nd channel of the TCM loop to add an analog port to the digital terminal. It has an RJ11 type jack accessible from the back of the telset.

The analog interface of the ATA is a 2-wire source, providing A and B leads (tip and ring) across which analog equipment (modem/fax) is connected. The loop length will be >100 feet. The analog interface of the ATA is compatible with the port types listed in [Table 18](#).

Table 18
Port types compatible with ATA

Country	Port Type(s)	Defining Standard(s)
United States	ONS Station Interface	EIA/Tia-464A
	Class A OPS Station Interface	FCC Rules Part 68
Canada	ONS Station Interface	CAN3-T512.1
	Class 1300 OPS Station Interface	CS-03 Part I

Refer to *Analog Terminal Adapter Quick Reference card* or *Installing an Analog Terminal Adapter* for detailed information on this feature.

Call Pickup Network Wide

Functional description

When multiple Meridian 1 systems are located at one site (e.g., large establishments requiring redundancy), the possibility of having users in close proximity to each other, yet not sharing the same telephone switch exists. This creates the need for a network-wide realization of features previously only meaningful on the local node. One such feature is Call Pickup.

The Call Pickup Network Wide feature allows you to extend the following functionalities over a Meridian Customer Defined Network (MCDN) Integrated Services Digital Network (ISDN) network:

— Ringing Number Pickup

- Directed Call Pickup by Group Number
- Directed Call Pickup by DN
- Display Call Pickup

With the exception of Display Call Pickup, user operation of the above features remains unchanged. To display Call Pickup, press the Display key, followed by the Call Pickup key. Display Call Pickup is modified so that the Ringing Number Pickup (RNP) key flashes for five seconds once a local or remote ringing DN is found and displayed. During this time, the user can press the RNP key to initiate a Call Pickup directed to the displayed DN.

With Call Pickup Network Wide, users must be assigned to the same Call Pickup group regardless of network location. Each Ringing Number Pickup Group may be assigned to a Speed Call List (SCL) which is used when there is not an applicable local set to pick up. Different groups may be assigned to different SCLs.

To route calls through the network from one originating node to a destination node, an ISDN Private Integrated Services Network Exchange (PINX) is defined for each node in the network. The ISDN PINX DN is a DN taken from the customer's numbering plan used to aid with the routing of network calls. It does not correspond to a real terminal on the node, so can never be busy. Each SCL contains a list of PINX DNs which correspond to the remote nodes or customers to be searched. Thus, the purpose of the Speed Call List is to let the system know where to look in the network to pick up the call. A pickup group linked to a Speed Call List is considered as being network wide.

The search is conducted in an ascending order as programmed in the Speed Call List (i.e., entry 0 first). This Speed Call list is used when there is not an applicable local set to pick up.

While a network search is performed, a slight delay occurs before a call is connected or rejected, and the set receives silence. This delay is traffic-dependent. If the call cannot be rerouted to the requesting party, the call will ring again at the originally dialed DN and the requesting party receives an overflow tone.

Call Waiting Redirection

Functional description

Previously, Call Waiting notified an active set that a second call was waiting on the DN. For non-attendant extended calls, the incoming call received Call Waiting treatment until answered by the called party or the calling party disconnected. For attendant-extended calls, the incoming call received Call Waiting treatment until answered by the called party or the calling party disconnected. For attendant-extended calls, the incoming call received Call Waiting treatment until the Call Waiting Recall timer timed out, at which time the call was recalled to the attendant. The attendant had to then extend the call to a message center or voice mail. However, since the attendant was given no indication as the reason for the recall (called party busy or not answering), it was difficult for the attendant to redirect the call properly.

In X11 Release 21, the Call Waiting Redirection feature follows the Call Forward No Answer (CFNA) treatment defined for the DN. No modifications have been made; all existing CFNA functionalities, including external and internal, apply to redirected calls.

Operating parameters

The existing Call Waiting and CFNA limitations apply to the Call Waiting Redirection Feature. The CFNA feature is used by the Call Waiting Redirection feature to redirect “no answer” calls given Call Waiting treatment.

Although the Call Waiting treatment is applied to a busy DN, the CFNA call redirection treatment given by the Call Waiting Redirection feature is for a “no answer” presentation. The unanswered Call Waiting call is treated as a call presented to an idle “no answered” DN. Calls redirected to messaging services or sets with displays are provided with the “no answer” call redirection reason.

The existing implementation of CFNA is used to select the TN with the CFNA DN for the “no answer” Call Waiting call. Calls are redirected according to the call type (internal or external) as defined at the designated call redirection TN chosen by CFNA.

Predictive Dialing

Functional description

Predictive Dialing automates the process of making outgoing calls to customers for Automatic Call Distribution (ACD) agents. Host applications can request the Meridian 1 to make calls using autodialers or phantom TNs. When a call is answered, the application sends a request to the switch to transfer the call to a live agent. The call must be transferred before, or while, the customer starts speaking in order to prevent customers from abandoning the call if they think no one has called them. This transfer was previously performed by Meridian Link in two steps by sending two separate Application Module Link (AML) messages to initiate and then complete the transfer. This operation requires a minimum of 400 to 450 milliseconds.

The Fast Transfer development in X11 Release 21 allows applications residing on the Application Module (AM) or host computers to transfer a call in one step—a blind transfer—by sending only one AML message (Fast Transfer) to the switch, thereby saving approximately 200 to 250 milliseconds of transfer time. This Fast Transfer feature is useful for predictive applications to make outbound calls and then quickly transfer them once the customer has answered (i.e., live voice has been detected). Fast Transfer can also be used in a non-predictive dialing environment. Applications can now perform a blind transfer more quickly.

The Predictive Dialing feature enables applications residing on the AM or host computers to send a combined Make Call and Transfer request on behalf of an autodialer or Phantom TN. As soon as live voice is detected by third-party equipment, or notification is sent to the switch indication the call has been answered (e.g., answer supervision), the application can send the Fast Transfer request to the switch, immediately transferring the call to an ACD agent.

Operating parameters

When Phantom TNs/DNs are used to originate calls as part of a predictive dialing operation, the option 11 will not be supported.

Attendant Consoles and Basic Rate Interface sets cannot initiate Fast Transfer of predictive calls.

The Meridian 1 does not support live voice answer detection. Live voice answer detection is currently achieved through third-party vendor equipment.

If phantom TNs/DNs are used, this development only supports calls and Fast Transfers originated by phantom TNs/DNs which are defined as Associate set (AST) BCS sets on a phantom loop.

Data calls are not supported.

For outbound trunk calls, if no third-party equipment is used to detect live voice answer, the switch depends on receiving answer supervision before transferring the call to the target DN.

If voice detection is used, the application will not be able to Fast Transfer the call before the call is established (i.e., answer notification is received).

The application will not be able to complete the transfer when Fast Transferring over a trunk.

Not all analog trunks support answer supervision. All digital trunks do not provide answer supervision. For trunks that do not support answer supervision, the End-of -Dialing (EOD) timer is used to trigger the transfer.

Receiving answer supervision depends on the accuracy of signals returned by the external network. Answer supervision may be received before an EOD timeout, fake answer supervision may also be received due to an EOD timeout, and a pseudo answer supervision may be received if the far-end has an EOD timeout even though the local switch has answer supervision configured.

The AML requires an Enhanced Serial Data Interface (EDSI) card or Multipurpose Serial Data Link (MSDL) card (NT6D80AA) on the switch. If an option 11 is used, a Serial Data Interface/D-channel (SDI/DCH) card (NTAK02AA) is required to configure the EDSI port.

The AML connection requires an RS232 cable.

Meridian Link software is required for host applications to utilize this feature.

China Phase 11—Flexible Feature Codes (FFC)

Functional description

Three new Flexible Feature Code (FFC) features have been developed to meet the requirements of the Chinese Ministry of Posts and Telecommunications for the rural switch market in China. The three features are Busy Number Redial (BNR), Customer Call Forward (CCFW), and Outgoing Call Barring (OCB). Each of these features has an option to provide a confirmation tone upon feature activation.

Busy Number Redial

Busy Number Redial enables PBX (500/2500) users encountering a busy condition to automatically redial the busy number by performing a switchhook flash and dialing the Busy Number Redial FFC. When the user next goes off-hook without dialing any digit, the busy number is automatically redialed. This feature remains in effect until the desired DN is reached, up to a maximum of 20 minutes.

Customer Call Forward

Customer Call Forward allows PBX users to forward their telephones to a central answering position by dialing the Customer Call Forward FFC. This feature activates the Call Forward All Calls function without having to specify the forwarded to DN.

Outgoing Call Barring

Outgoing Call Barring allows a set to be blocked from making some or all outgoing calls. Three levels of barring are available. The user selects the level by dialing the Outgoing Call Barring FFC, the barring level desired, and the Station Control Password

The three levels are each associated with a New Flexible Code Restriction (NFCR) tree in the Customer Data Block. When a DN is dialed, the digits dialed are compared to the associated NFCR tree and busy tone is given if the call is barred. An FFC is also available to verify that the feature is active.

The active level cannot be changed without first deactivating the feature and reactivating it with a new level.

Operating parameters

Although designed for China, the China Phase II - Flexible Feature Codes feature can be used in other markets.

Busy Number Redial is only available for internal calls and for trunk calls that provide a busy signal when busy tone is given.

Busy Number Redial and Customer Call Forward are only available for PBX (500/2500) sets.

Outgoing Call Barring is only available for PBX and BCS sets (excluding BRI sets).

The Reply DN for CCFW is limited to 16 digits.

OCB will only process “*” and “#” according to the active NCFR tree if the digits are to be outpulsed on a route with OPR active (including all necessary conditions for OPR). If they are dialed as part of an FFC, the call is allowed; otherwise, an octothorpe will cause the call to be blocked. A star will be ignored, except during digit counting. Thus, FFCs containing a “*” or an “#” cannot be blocked by this feature.

OCD will not prevent calls from terminating when there are too few dialed digits to traverse the full NCFR trr (e.g., if the active tree is set up to bar 2001, but a DN of 200 exists, calls to 200 will be allowed with no error message).

The maximum number of digits that will be processed by OCB is 32. If the call is not allowed or denied by that point, the call is barred.

OCB can bar feature access codes such as Special Prefix (SPRE) codes and numeric FFCS. It will not bar the digits dialed after an access code.

Directory Number Delayed Ringing

Functional description

There are two types of Directory Number keys: ringing and nonringing. The Directory Number Delayed Ringing (DNDR) feature provides an audible notification (e.g., ringing, buzzing, etc.) after a specified delay to nonringing keys for a particular Terminal Number (TN). These keys can be either Single Call Non-Ringing (SCN) or Multiple Call Non-Ringing (MCN).

When an incoming call is presented to an SCN/MCN key, the associated lamp flashes. If Directory Number Delayed Ringing is defined for the set, an audible notification is given after a defined number of seconds (from 1 to 120 seconds). The DNDR value is defined in LD11, and the feature is disabled if zero is selected as the delay value. When the feature is disabled, all SCN/MCN keys for this particular TN will not receive audible notifications.

Operating parameters

Only BCS sets with DN key type SCN or MCN may use this feature; PBX (500/2500) sets are not supported.

The DNDR feature is enabled on a TN basis. Thus, all or none of the SCN/MCN keys for the TN will receive the audible notification.

For a single call, two appearances of a Multiple Appearance Directory Number (MADN) may ring simultaneously if their DNDR values differ by two seconds or less.

The DNDR value can be different for multiple TNs with the same DN appearance. Therefore the audible notification may begin at different times for a single call.

Set-Based Administration Enhancements

For the option 11, the functionalities that have been offered by Set-Based Administration prior to Release 21 are now grouped under the following two tasks on the main menu, under administration access:

- Administration: provides a grouping of trunk-related options.
- Installation options: provides the same functions as before; however, it is moved to a new location on the main menu.

Since these capabilities are only available to option 11, they will not be displayed on the main menu for other system types.

Functional description

Previously, Set-Based Administration was a feature available in Meridian 1 option 11 systems that simplified system installation and administration by enabling a set to be used to perform several administrative and maintenance procedures. With the Set-Based Administration Enhancements feature, Set-Based Administration is now available for all system types. In addition, enhancements are provided to the existing capabilities on the option 11.

To further enhance Set-Based Administration, three levels of set-based data administration access are available with the following capabilities:

- Administrator Access allows a system administrator to make changes to any supported telephones within a customer location. The system administrator can perform any of the following tasks through an administration/maintenance set (M2008, M2016, M2616 with display):
 - Change the data associated with specific set-related features:
 - Hunting, External Hunting, Call Forward No Answer, External Call Forward No Answer, Call Forward, Busy Forward Status, Voice Call, Dial Intercom Group, Group Call, Ringing Number Pickup Group, Speed Call, System Speed Call, and Hot Line
 - Add or change the Calling Party Name Display (CPND) names associated with existing DNs
 - Change system date and time
 - Change toll restrictions of any set
 - Determine Directory Number-Terminal Number correspondence

- Installer Access allows an installer to perform any of the following tasks to a set from which the installer is logged in:
 - Change the data associated with specific set-related features
 - Add or change the CPND names associated with the DN on that set
 - Change system data and time
 - Change toll restriction for that set
- User Installation allows a user to add or change the user's own CPND when logging in through the user's own set.

Administrator and Installer Access are invoked by dialing the Administrator or Installed Flexible Feature Code (FFC) followed by the Administrator or Installer password. The passwords are defined on a system basis. User Access is activated by dialing the Set-Based Administration User FFC followed by the Station Control Password of the user's set.

The multi-language capability of this feature supports all languages currently supported on the option 11: English, German, Spanish, Swedish, Canadian and Parisian French, Dutch, Italian, Danish, Portuguese, and Norwegian.

Operating parameters

With the exception of CPND, features cannot be added to or deleted from a set using this feature.

The CPND name change enhancement to Set-Based Administration is not supported using non-display sets, due to the complexity of operation without visual feedback.

If the user has the ability to see the data, the data can be changed.

With the exception of CPND support, the Meridian Mail subsystem integration is not supported. Meridian Mail mailbox changes cannot be performed by means of Set-based Administration.

Network login is not supported; a set can only login on its home node.

Entry of "*" and "#" in extension numbers is not supported using Set-Based Administration, because these are the keys that the feature uses to control user navigation through menus.

Access from SL-1 or BRI sets is not supported.

Set-Based Administration logins cannot be made from Direct Inward System Access (DISA) calls.

Collect Call Blocking

Functional description

An automatic long distance collect call service called DDC is available in Brazil. The Collect Call Blocking feature enables a Meridian 1 administrator to block DDC calls on incoming Direct Inward Dialing (DID) and Public Exchange/Central Office trunks (analog or DT12).

Under the following conditions, the Meridian 1 sends a special answer signal to the Central Office to indicate to the Central Office that collect calls cannot be accepted:

- The Collect Call Blocking (CCB) package 290 is enabled
- The incoming route has CCB enabled via the CCB prompt in the Route Data Block
- The call is answered by a CCB user (i.e., Collect Call Blocking Allowed Class of Service or option)

New classes of service and prompts have been introduced to inhibit specific users from receiving collect DID and Central Office calls. These can be configured for the following:

- PBX and BCS through the Collect Call Blocking Allowed/Denied (CCBA/CCBD) option
- Attendant and Network Alternate Route Selection calls on a per customer basis through CCBA/CCBD option
- Automatic Call Distribution (ACD) queues through the CCBA prompt
- Direct Inward System Access (DISA) through the CCBA prompt
- Tandem calls dialed with Coordinated Dialing Plan (CDP) (Trunk Steering Code, Distant Steering Code) through the CCBA prompt
- Tandem non-CDP calls through the CCBA prompt in the Route Data Block from the outgoing trunk route

When a call is answered by a CCB user, the Meridian 1 sends the CCB answer signal in place of the regular signal for incoming DID/CO calls from the routes with CCB enabled. If the call is a collect call, The CO will disconnect the call.

Operating parameters

The Collect Call Blocking feature supports both analog and DT12 trunks, and the following Intelligent Peripheral Equipment (IPE) cards:

- NTCK 16BB Extended Flexible COT Trunk Card (XFCOT) with firmware flash timing
- NT8D14BA Enhanced Extended Universal Trunk Card (EXUT) containing the Centrex Switchhook Flash function in the firmware
- NT8K14AK Extended Universal Trunk Card (XUT), which may be used if the Centrex Switchhook Flash is configured with software timing

The Collect Call Blocking answer signal can only be sent in cases where answer supervision is provided by the Meridian 1.

Once the modified answer signal is sent to the CO, the Meridian 1 has no control over how the call will be handled by the CO.

If a CCB user answers a call from a CO/DID route with Collect Call Blocking activated, the CCB answer signal is sent to the CO for all incoming DID and CO calls. For analog trunks, the user experiences clicking on the line and a temporary break in speechpath (0.5 to 2.5 seconds) while the CCB answer signal is being sent.

If the XFCOT and EXUT cards do not have flexible firmware timing, the CCB flash portion of the CCB answer signal will be ignored by firmware, and the regular answer signal will be returned to the CO. However, software controlled signaling can be done with EXUT cards.

In a standalone environment, all input from a set (except from the Release key) is ignored while the Collect Call Blocking answer signal is being sent.

Collect Call Blocking is applied to attendants on a customer basis only; it cannot be applied on a tenant basis.

The answer signal returned for a call from a route that is Network Attendant Service (NAS) routed and with CCB enabled is determined by the customer option on the source node. Thus, NAS routing can be configured across any Meridian Customer Defined Network environment, but the source node determines the answer supervision sent to the CO.

Call Detail Recording (CDR) record timing begins on the first answer of the CCB answer sequence. For this reason, CDR records will be generated for incoming calls to CCB users across routes on which CCB is enabled. If the call is collect, and is dropped, a CDR record of approximately CCB1+CCB2 length is generated.

For data calls, all calls will be answered with the CCB answer signal, if CCB is enabled. This may have an effect on data protocols, while CCB signaling is taking place.

If firmware timing is used (FWTM=YES in LD14) for sending the CCB flash, the CCB2 timer is downloaded to the card before sending the firmware flash. If the CCB2 timer is changed in the Route Data Block, either the Card must be enabled or the switch must be initialized to get the new CCB2 timer downloaded to the card.

Call Pickup Network Wide

Operating parameters

Call Pickup Network Wide is not supported over a Virtual Network Services (VNS) or QSIG link.

A Speed Call List must be configured with the PINX DNs of both the local and remote switches.

If two calls are ringing on one single node at the same time, the call with the higher priority is picked up. But if two calls are ringing on two nodes at the same time (one call on each node), the call on the node searched first will be picked up (i.e., a normal ringing call on the local node is picked up before a ringing set on a remote node).

DPNSS Executive Intrusion

Functional description

A station (the originating party) tries to reach a station (the wanted party), but receives busy treatment because a call is already established between the wanted party and a station called the unwanted party.

Executive Intrusion allows the originating party to break into the established call under certain circumstances. If intrusion succeeds, a conference takes place on the wanted node between the originating, wanted and unwanted parties.

Conditions for intrusion success are basically comparisons between the Intrusion Capability Level (ICL) of the originating party and the Intrusion Protection levels (IPL) of the wanted and unwanted parties.

The Meridian-1 implementation provides Executive Intrusion from Attendant Consoles. Executive Intrusion from Telephone Sets is not supported. However, a Meridian 1 PBX will accept an EI activation request from an ordinary set on a third party PBX.

Electronic Lock Network Wide

The Electronic Lock feature allows a set (station) user to “lock” a set to disallow unauthorized use of the telephone. This is done by changing the Class of Service to the restriction level defined in the Customer Data Block (CCRS). The user can toggle the set between lock and unlock. Unlocking a set returns the Class of Service to the level that was originally defined (in Overlay 10/11).

Functional description

The set may be locked/unlocked from:

- the set to be (un)locked—by dialing an appropriate Flexible Feature Code (ELKA/ELKD FFC), followed by the set's Password
- a set other than the one to be (un)locked—by dialing the ELKA/ELKD FFC, the Password of the set to be (un)locked, and its DN

Locking/unlocking can only be done from within the same customer, and not network-wide.

The current implementation of the feature does not affect the Private DNs, i.e. calls can be made on private DNs even if the set locked.

Network Operation

In the Network operation mode (the present enhancement of Electronic Lock), the feature may be activated/deactivated also from a node of the MCDNISDN network, other than the node the set to be (un)locked belongs to, by dialing the ELKA/ELKD FFC, the Password of the set to be (un)locked and the digits he would dial to ring the set to be (un)locked (i.e. the network DN).

Since the password length of the destination node is not known at the originating site, the SCPL must be defined the same all over the network. If the originating node has the FFCT option selected, a confirmation tone will be given when the feature is successfully activated or deactivated. If the network lock/unlock operation is unsuccessful, overflow tone is given and the set's previous state remains unchanged.

There is no specific FFC Verify code for ELCK. To verify the locking/unlocking of the set, the user must activate/deactivate the feature by using ELKA/ELKD FCC. If the operation is successful, confirmation is given that the set is locked/unlocked.

Modified Network Class of Service

A new prompt, CNCS, is added to overlay 15 to select the Controlled Network Class of Service. When the locked set makes an outgoing trunk call, if CNCS is defined, the NCOS defined by CNCS is used instead of the NCOS of the locked set defined in overlay 10/11 when selecting the outgoing trunk. If network signaling is configured for the trunk which would usually transmit the set's NCOS between ESN network nodes, the CNCS is transmitted instead of the NCOS. This feature does not modify the network signaling feature other than to substitute the CNCS for the NCOS if the set is locked.

Modifying the NCOS of a locked set using CNCS, although intended for network use, can be used to better control the locking of sets by changing the NFCR restrictions instead of the "all or nothing" effect of just changing the class of service. This would require the CCRS to be TLD or CTD.

Electronic Lock on Private Lines

This feature introduces a new prompt in the customer data block, PELK (Private Electronic Lock). With the implementation of this feature, an attempt to make an outgoing call on a private line of a locked set when PELK=YES will be subject to the same restrictions as all the other DNs on the telephone. Attempts to make restricted calls on a private line of a locked set will receive the same intercept treatment as would a regular DN key.

The restrictions for private lines (and all other DN Keys) are by the Controlled Class of Service (CCRS) and by the Network Controlled Class of Service (CNCS), if CNCS is defined. Thus for outgoing calls, class of service restrictions and/or NFCR restrictions will apply all to private line keys on locked sets.

The route data block overlay programs (16 and 21) are modified to enable the system administrator to define/print the NFCR definitions (FRL) for private routes.

Electronic Lock on Private Lines only locks outgoing calls. Incoming calls are not affected; incoming private line calls still terminate on a set, regardless of its locked state.

There is no change in the way that the electronic lock is configured or dialed.

The class of service (COS,NCOS) of a non-locked set has no affect on private lines.

If PELK is NO, private lines DNs operate as they did prior this feature's implementation.

Line Disconnect

The 500/2500 Line Disconnect functionality was developed for incoming calls in Release 17. This feature provides the same functionality for outgoing calls as well. With this feature, both incoming and outgoing calls are supported. This feature enhancement provides the same functionality for outgoing calls.

Functional description

When Meridian 1 detects an on-hook/disconnect supervision signal from a party on an answer supervised trunk connected to a 500/2500 port with the class of service (LDTA), dialtone is sent to this 500/2500 port for the duration specified in the customer data block. Dialtone is currently used in central offices as a disconnect signal. This is particularly useful in applications where the 500/2500 port is connected to some sort of Automated Dialing equipment. The dialtone is a signal for this device to disconnect itself and the line port as well. Dialtone is only given to a 500/2500 port with the Class of Service LDTA at disconnect of a simple call. If an ADE/VRU is involved in a conference for example, and one of the other parties disconnect, dial tone will not be given since there is still one or more parties connected to this call. When the last party (other than the VRU/ADE) disconnects then the dial tone will be applied.

This product enhancement applies to any outgoing call that is connected to a 500/2500 port with LDTA class of service (Line Disconnect Tone Allowed). Together with the previously developed feature 500/2500 Line Disconnect for incoming calls, this capability will now operate for all calls that involve a 500/2500 line port with the Class of Service LDTA.

Dialtone duration is already defined in the Customer Data Block as an existing timer, (e.g. LDTT-Line Disconnect Tone Timer) as it was part of the development of the 500/2500 Line Disconnect Feature for incoming calls in X11 Release 17. This enhancement will use the same timer. The default time is set to 6 seconds, the minimum time can be set to 2 seconds and the maximum time to 30 seconds. After dialtone is provided for the specified duration, the port will be in line-lockout mode. Line lockout will be changed to idle upon receipt of an on-hook signal from the ADE. If no on-hook signal is received, the port could be locked up indefinitely.

Series Call

The Series call feature provides the capability to have calls recall to the attendant upon disconnect of the terminating internal party. This feature is packaged with the “SUPP” package.

Functional description

Series Call enables the attendant to mark a call as a Series Call by pressing the new SECL key on the attendant console while dialing, ringing, or talking to the external party. When the (internal) destination party disconnects, the source party returns to the attendant (the same attendant if RTSA is configured) on the RECALL ICI with the SECL key lit. The attendant can then extend the call to another party, canceling the series call by pressing the key if desired.

Multi-Party Operations

Functional description

Multi-Party Operations consists of a number of features as described in this section, namely

- Call Join
- Three Party Service
- Three Party Service Timer Option
- Control Connection Disconnect Option
- Recovery on Mis-operation of Call Transfer
- Ignore Switch Hook Flash from 500/2500 Set
- Forced Register Recall from 500 Set
- Manual Return after Enquiry

Call Join

Call Join applies to all SL-1 sets (regardless of COS) that are equipped with a Conference-3/6 key, and at least one secondary DN or Call Waiting key. This feature allows the CP to conference-in a party held on his or her set to the active call, transfer the active party to an HP by forming a conference, and then disconnect.

Three Party Service

Three Party Service applies to 500/2500 sets with Three party Service Allowed (TSA) COS. 500/2500 set operation is not changed for “XFD” or “XFA” Classes of Service. During a normal two-party call, the CP can place the established call on hold and originate another call. After the second call is established, the CP can dial a Programmable Control Digit (which can take the values CNFD, TGLD and DISD) to:

- Form a three-party conference between the CP, held, and active parties and if the CP wishes, transfer the AP to the HP by forming a three-party conference and then disconnecting. (Control Digit =CNFD)
- Exchange the active and held calls (Control Digit=TGLD)
- Release the active call and reconnect the held call. (Control Digit=DISD)

The Control Digit is programmed in Overlay 15 (CDB). The default values for CNFD,TGLD and DISD are 1,2,3 respectively.

Three Party Service Timer Option

A timer is provided on a customer basis to control the reconnection of HP or AP to CP when CP does not enter the control digit within the specified time. The timer is specified by programming the CDTO prompt in Overlay 15 (CDB) with a value in the range 2-12 seconds. The CDTO has the default value of 14 seconds.

If CDTO has the non-default value and CP does not enter the control digit, and, if MHL D is yes, then silence is given to CP. When user recalls, AP is released and HP is reconnected to CP. Instead, if MHL D is no, then AP is released immediately, and HP is reconnected with CP.

If the user selects either the default option (14 seconds) or enters “14” seconds, then, if a control digit is not entered within CDTO expiry, the overflow tone is given to the user. If CP recalls, then AP is reconnected to CP with HP on hold. If overflow tone times out, MPO action is determined by MHL D option: If MHL D is yes, silence is given to CP, and when the user recalls AP is reconnected to CP. If MHL D is no, then AP is reconnected to CP immediately.

Control Connection Disconnect Option

An option (CCDO) is provided to control the behavior of MPO when any of the parties in the consultation call disconnect. This option is programmed in Overlay 15 (CDB).

Conference-6

If MPO package is enabled, then Conference-6 is available from 500/2500 sets with the combination of TSA and existing C6A COS's. This feature is an extension of Three Party Service which allows the CP to build a conference of up to six parties by consulting and selectively adding members through the use of Control Digits.

Recovery On Mis-operation Of Call Transfer

The "Recovery on mis-operation of Call Transfer" feature provides protection against having outside calls lost due to mis-operation of the "Call Transfer" feature. A mis-operation call occurs whenever the transferring party attempts to complete a transfer before the called party answers.

MPO recognizes two types of mis-operations:

- Mis-operation of Call-Transfer on Ringing with No Answer (RGNA)
- Mis-operation of Call-Transfer for All Other Cases

Mis-operation of Call-Transfer on RGNA

Mis-operation of Call-Transfer on RGNA occurs when the transferring party attempts to complete the transfer while receiving ringback or call waiting tone.

If a station user (SL-1, 500, or 2500 set) transfers a call to an idle station, or a busy station with either Call Waiting (CWA) COS (500/2500 set) or with Call Waiting (CWT) Key lamp (SL-1 set), in the ringing state, then the transferring party receives Ringback Tone while the called station is ringing if it is idle. If the called set (500/2500) is busy but has CWA COS, then it hears Call Waiting Tone. If the called set (SL-1) is busy on a DN Key but has a CWT Key Lamp, then the called party hears CWT key ringing and Lamp flashing. If the user completes the call transfer operation in this case (by pressing the CALL TRANSFER key at the SL-1 set, or by doing on-hook at the 500/2500 set while the called party is still ringing), then mis-operation (RGNA) is detected.

Mis-operation of Call-Transfer for All Other Cases (AOCS)

When a 500/2500 set attempts to complete a transfer in one of the following scenarios, operation is treated as AOCS:

- Call-transfer while dial tone is being heard
- Call-transfer before completing dialing
- Call-transfer during outpulsing of digits on a trunk
- CP goes on-hook during consultation connection (“CCDO=NO”)
- CP goes on-hook during control dial tone
- Call-transfer to intercept treatment for:
 - Call-transfer to busy station with CWD (500/2500) or no CWT KEY (SL1)
 - Dialing a vacant number
 - Terminal is in maintenance busy
 - RPE failure state
 - Access denial;
 - Code/Toll restricted set
 - Network blocking
 - Invalid, invalid translation, restricted or blocked NARS/BARS calls
 - Partial dialing
 - Trunk-to-trunk connection restrictions
 - Inter-tenant blocking
 - During reception of announcements
 - During reception of tones (Control, special)

The Recovery options are specified for both RGNA and ACS cases in Overlay 15 (CDB) when MPO package is equipped. You can specify separate treatment for external and internal calls.

Ignore Switch Hook Flash from 500/2500 Set Option

It is optional on a customer basis whether or not to ignore a Switch Hook Flash (IFLS) from a 500/2500 set. This eliminates the confusion between a flash signal and a dial “1” signal on 500 sets, especially when 500 sets have been given DTN Class of Service. If the flash is to be ignored, 500/2500 sets should have a Ground Button in order to use those features which require a Register Recall Signal (an action taken by the user which puts the set in a dialing state).

Forced Register Recall from 500 Set Option

The Forced Register Recall (RALL) option is provided on a customer basis and specifies whether a Register Recall is required on 500 sets before dialing control digits. If the system does not require a Register Recall from 500 sets, then a Switch Hook Flash is interpreted as a dial “1” (default “CNFD”) causing that control digit assignment to be activated.

Option RALL is specified in Overlay 15 (CDB). [Table 19](#) shows the allowed values of RALL for 500/2500 sets:

Table 19
Allowed values of RALL

	DTN COS	DIP COS
500 Set	Yes, No	Yes, No
2500 Set	Yes	Not Applicable

Manual Return after Enquiry Option

When a 500/2500 user places a party on hold by using register recall, the user receives SDT followed by Overflow tone. During this period, the HP is listening to silence or recorded announcement, if it is equipped. The Manual Return after Enquiry (MHL) option controls the way the HP is reconnected to the CP. If MHL=NO (default), then the CP is automatically reconnected to the HP after the overflow tone timeout. If MHL=YES, then the CP receives silence indefinitely after the overflow tone timeout until a second recall is performed to retrieve the HP. There is no automatic reconnection of the HP. The CP may manually return to the HP by performing a second recall during Special Dial Tone, Overflow Tone, or during the silence period.